

### **REMARKS**

Claims 1-38 are all the claims presently pending in the application.

It is noted that the claim amendments, if any, are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 25 and 26 stand rejected under 35 U.S.C. §101 as directed toward statutory subject matter.

Claims 23, 25, 27, 29-32, 35, and 36 stand rejected under 35 U.S.C. § 102(e) as anticipated by US Patent 7,213,234 to Below et al.

Claims 1-22, 37, and 38 stand rejected under 35 U.S.C. §103(a) as unpatentable over Ramil et al., “Cost Estimation and Evolvability Monitoring for Software Evolution Processess”, and claims 24, 26, 28, 33, and 34 stand rejected under 35 U.S.C. §103(a) as unpatentable over Below, further in view of Ramil.

These rejections are respectfully traversed in the following discussion.

#### **I. THE CLAIMED INVENTION**

The claimed invention is directed to a method of estimating a cost related to at least one of computer software development, computer software maintenance, and information technology services. A sample of computer code is read in accordance with a sampling technique and a cost for a larger subset of the computer code from the sampling is calculated. At least one of the reading, the sampling, and the calculating is executed on a computer.

As explained beginning at line 4 on page 3 of the specification, estimating costs for modifications to existing software, such as porting, as well as other activities related to existing software such as maintenance, application portfolio management, and legacy transformation of software, typically requires a comprehensive investigation including scanning the entire set of code to look for potential problems. This comprehensive approach can be very expensive and time consuming.

The claimed invention, on the other hand, teaches a novel method to estimate such costs by deriving a cost estimate using a sampling of the code.

## **II. THE STATUTORY SUBJECT MATTER REJECTION**

The Examiner alleges that claims 25 and 26 are directed to "... transmission media, light waves, a carrier wave, etc." and, therefore, non-statutory. In response, even if this interpretation were to be considered reasonable, Applicants submit that the wording of the claim preamble clearly refers to a "... signal-bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform a method of ...."

Applicants further submit that this wording clearly refers to a process, since a program of instructions defines a process executable on a computer. A process is one of the four categories explicitly defined in 35 U.S.C. §101. Therefore, even if the wording were to be construed as directed to "... transmission media, light waves, a carrier wave, etc.", it is still directed to statutory subject matter, as defined in 35 U.S.C. §101.

Moreover, Applicants respectfully submit that this wording also is directed to Beauregard-type claims that cover storage media containing computer-readable code and are considered to be objects of manufacture by the USPTO, as per US Patent No. 5,710,578 to Beauregard et al., issued on January 20, 1998.

Therefore, Applicants respectfully submit that the wording of these claims has at least two interpretations clearly directed to statutory subject matter and the Examiner is respectfully requested to reconsider and withdraw this rejection.

## **III. THE PRIOR ART REJECTIONS**

The Examiner alleges that claims 23, 25, 27, 29-32, 35, and 36 are anticipated by Below, that claims 1-22, 37, and 38 are unpatentable over Ramil, and that claims 24, 26, 28, 33, and 34 are unpatentable over Below, further in view of Ramil.

Applicants respectfully disagree. Moreover, Applicants respectfully submit that the rejection currently of record fails to establish a *prima facie* rejection because the two prior art references fail to demonstrate the elements of the claimed invention, as the plain meaning would be interpreted by one having ordinary skill in the art. Neither of these two references are directed to the problem addressed by the present invention, so that reference in Below to sampling computer code differs in scope from that needed to achieve the claimed invention.

The Anticipation Rejection Based on Below

The Examiner alleges that claims 23, 25, 27, 29-32, 35, and 36 are anticipated by Below. Below is directed to an attempt to estimate function points for clients without performing a manual count for an entire application. It is all about selecting a subset of an application's programs for manual counting of function points, extrapolating from the counted function points to estimate the total function points for the application, including statistical analysis to make some assertions about the likely accuracy of the function point estimate. Below concerns an estimate of cost or resource, just a sum total of function points.

In a nutshell, function point counting is a pain because it is done by people, not tools. The International Function Points User Group (IFPUG) claims that human judgment is required to properly classify data store and program logic for summarization as function points. IFPUG asserts that only its trained, certified members can properly count function points.

In contrast, the present invention is about using one of several sampling and optional stratification techniques to select a subset of an application -- possibly at different levels of granularity -- to perform automated analysis of the sample, identify changes and risks, generate work breakdown structures, and estimates of costs and resources.

Therefore, even if Below is considered to disclose the method of sampling a computer code for purposes of efficiency in estimating a portfolio's size, his invention stops there. The present invention goes at least two steps further:

- It classifies the sampled code into categories and evaluate their difficulty; and
- It uses the results of the classification to estimate costs (\$ and resources).

The Examiner alleges that Below anticipates claims 23, 25, 27, 29-32, 35, and 36. However, as explained above, Below does not attempt to use sampling for any purpose except estimating a portfolio's size.

Hence, turning to the clear language of the claims, in Below there is no teaching or suggestion of: “An apparatus to estimate at least one of a cost and an amount of necessary resources for an effort related to computer software development, computer software maintenance, and information technology services, said apparatus comprising: a memory to store a computer code involved in an effort related to software development”, as required by independent claim 23. Independent claims 27 and 32 have similar language or concepts.

Relative to claim 25, there is no teaching or suggestion in Below for: “... to perform a method of estimating at least one of a cost and a necessary amount of resources for an effort

related to computer software development, computer software maintenance, and information technology services, said method comprising: reading a section of computer code; sampling said computer code in accordance with a sampling technique; and using said sampling to calculating said at least one of cost and amount of resources for a larger subset of the computer code from said computer code from said sampling, wherein said sampling, and said calculating is executed on a computer.” Claims 29 have similar language or concepts.

Dependent claims 31, 32, 35, and 36 get into even deeper costing details not suggested by Below.

Therefore, Applicants respectfully submit that claims 23, 25, 27, 29-32, 35, and 36 are clearly patentable over Below because of its entirely different purpose.

#### The Obviousness Rejection Based on Ramil

The Examiner alleges that Ramil renders obvious claims 1-8, 9-22, 37, and 38.

The examiner attempts to makes a link between Ramil and Below that is not justified. One would have to make a huge leap to see directly how to use Below's method to construct a cost model for Ramil's procedure.

That is, although the Ramil paper is somewhat interesting, it is completely irrelevant to the present invention. Ramil presents a system dynamics model of software evolution. The system dynamics model basically says there are two forces that affect the "evolvability" of software. Applicants note that the existence of these forces is well known among people who study software, as follows.

- Work that has been done on software in response to work requests. This is generally done to increase the power or functionality of a system. This is sometimes called progressive work.
- Work that's done on software to control complexity. This is sometimes called anti-regressive work.

The System Dynamics model shows how "work requests pending", "work implemented", "cumulative work", "anti-regressive work", and various factors interact over time to make software more or less evolvable. Again, this is well known in the software community.

The paper goes on to say that techniques from the Change Detection field can be used to detect changes in things that are important for software maintenance. The change detection process uses process metrics from the software evolution process and product metrics the software product. The change detection process also uses a model of software evolution that should provide estimates of cost or other interesting parameters. The paper assumes that the software evolution model exists without actually providing such a model.

Applicants suggest that this paper is long on generalities and short on practical applications.

In section 16 of "YOR920030297US1 Office Action (7-17-07).pdf", the office action says

*Ramil discloses a method of estimating a cost related to at least one of computer software development, computer software maintenance, and information technology services*

Ramil does not actually disclose a method of estimating a cost related to at least one of computer software development, computer software maintenance, and information technology services. Ramil assumes that there are methods (models) for estimating costs because this assumption is necessary for the rest of the paper. Ramil does not show that such models exist. In fact, Ramil hints at the non-existence of such models in section 3, where Ramil says "the cost modelling work is still in its early stages." Assuming that such models exist, Ramil proposes monitoring the models' cost estimates over time. This is shown by what Ramil says in Section 1:

*Evolution of a particular system may span several years, even decades. This offers the possibility of using historical data from the system itself, as a basis for the calibration of models.*

Ramil proposes using Change Detection techniques to compare (1) metrics related to the evolving software, (2) metrics related to software evolution process, and (3) the model's predictions. Ramil says that a significant change could indicate many things, such as a need to change the software, the process, or the model.

The office action's argument seems to be this: (1) Ramil proposes using Change Detection to calibrate models that predict cost; (2) Change Detection uses statistics; (3) Statistical sampling of code is used in the Paul Below patent; (4) The present invention uses statistical sampling to estimate costs; therefore, our patent application should not be allowed. While this line of reasoning might be valid at first glance, it breaks down upon closer examination.

Actually, Applicants respectfully submit that Ramil is irrelevant to the present invention. First of all, Ramil does not show how to estimate cost. Ramil assumes that cost models exist. In addition, Ramil is about the change in costs over time. The present invention relates to software at one point in time. The method of the present invention doesn't care how the software came to be in its present state.

With respect to the Ramil paper, it seems to make the unremarkable observations that cost (and other) models can be improved by calibrating them against past results, and that changes measured in costs and productivity may be indicators of change in a software system's so-called evolvability. It says cost models are important, but it does not, contrary to the examiner's assertion at 16, "disclose a method of estimating a cost."

One can spend some time reading and re-reading the fourth paragraph in section 3, which the examiner calls out. The paragraph does not talk specifically about cost modeling. Its focus is on ways to monitor software productivity and evolvability. It appears the examiner at 16 has underlined "... the inputs and outputs of the process are statistically compared to the model's prediction."

In contrast, the present invention deals with the use of statistical methods to create the estimate as an output. Ramil's paper on using statistical methods with estimates as an input seems immaterial.

It is interesting to see that the outcomes Ramil listed as examples triggered by change detection -- process revision, software restructuring, and software replacement -- do not include revision of the model.

So, while Ramil discloses statistical comparison to a model's prediction, that is not relevant to the use of statistics to create an estimate. There is a reason why Ramil does not explicitly disclose reading a sample of code ... the same reason it does not make any implicit reference to reading code: Ramil is not relevant to analyzing code to produce a plan and estimate.

Therefore, relative to claim 1, Ramil does not teach or suggest: "A method of estimating a cost related to at least one of computer software development, computer software maintenance, and information technology services, said method comprising: reading a sample of computer code in accordance with a sampling technique; and calculating a cost for a larger subset of the computer code from said sampling..." Independent claims 19 have similar language or concepts. Independent claims 9 and 21 have similar language related to calculation of resources.

The Rejection of Claims 24, 26, 28, 33, and 34 Based on Combining Below with Ramil

Applicants respectfully submit that the combination of Below with Ramil fails to establish a *prima facie* rejection for these claims, since, as explained above, neither Below

nor Ramil suggests using sampling of code for the purpose of estimating cost or resources for an effort related to software. Below teaches using sampling to estimate function point count and Ramil concerns incorporation of evolvability into cost models. Neither of these two concepts, even if combined, are directed to the plain meaning of the claimed invention, and the combination of these two references fail to overcome this deficiency either for the independent claims or for the above-recited dependent claims.

Therefore, Applicants submit that these claims 24, 26, 28, 33, and 34 are also clearly patentable over even the combination of Below and Ramil.

### **Detailed Rebuttal of Rejections Related to the Ramil Paper**

In its objections to claim 1, the office action asserts that it "would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Below into the Ramil's [sic] system to further provide reading a sample of computer code in accordance with a sampling technique in Ramil system." Since (a) our patent examines the code at one point in time to make an estimate and (b) Ramil's idea is to monitor a system at more than one point in time to detect changes, the office action's objection is unfounded.

Note that there is nothing wrong with combining Ramil's ideas with Below's invention. You could use Below's invention to get metrics for input to the change detection scheme. That is just not what is being claimed in the present invention, since the present invention is not about detecting changes, and it is not about calibrating models. It is about estimating costs of projects related to a software program at a given point in time.

The office action's section 16 also combines text fragments from different sources as if they are all in the Ramil paper. This makes the section more confusing than it needs to be.

In section 17, the office action addresses claim 9, our second independent claim. the office action again claims that it "would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Below into the Ramil's [sic] system to further provide reading a sample of computer code in accordance with a sampling technique in Ramil system." This objection is unfounded for the same reason it was unfounded in section 16.

In section 18, the office action addresses claim 19, our third independent claim. This time, the office action says that it "would have been obvious to one of ordinary skill in the

art, at the time the invention was made to combine the teachings of Below into the Ramil's [sic] system to further provide sampling computer code in accordance with a sampling technique ...." Again, our method provides a way of calculating a cost and "at least one of a risk probability and an estimation precision for said cost," whereas Ramil uses metrics at multiple points in time to find divergence between the real world and the model. There's nothing wrong with finding the divergence, but Ramil doesn't show how to calculate the cost (much less the risk probability or the estimation precision); and Below shows how to estimate portfolio size, which is a lot simpler than estimating the cost of modifying a portfolio.

In section 19, the office action addresses claim 21, our fourth independent claim. Claim 19 and claim 21 are very similar except that claim 19 is about estimating "cost" and claim 21 is about estimating "necessary amount of resources". The office action again claims that it "would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Below into the Ramil's [sic] system to further provide sampling computer code in accordance with a sampling technique ...." My objections to this line of reasoning are same as my objections to section 18's reasoning.

The sections following section 19 address dependent claims. In section 20, the office action addresses claim 2. The office action's rejection of claim 2 incorporates its rejection of claim 1. As previously explained, the office action's rejection of claim 1 is invalid. Its rejection of claim 2 is invalid because it incorporates an invalid premise. Because sections 20 through 35 follow the same structure, I've put my responses into the following table.

Section of the Office Action	Claim rejected by this section	Incorporates the rejection of this claim	The reason this rejection is invalid.
20	2	1	The rejection of this claim incorporates an invalid premise
21	3	1	The rejection of this claim incorporates an invalid premise
22	4	1	The rejection of these claims incorporates an invalid premise.
	12	9	
23	5	1	The rejection of this claim incorporates an invalid premise.
24	6	1	The rejection of this claim incorporates an



<b>Section of the Office Action</b>	<b>Claim rejected by this section</b>	<b>Incorporates the rejection of this claim</b>	<b>The reason this rejection is invalid.</b>
	16	12	invalid premise.
25	7	1	The rejection of these claims incorporates an invalid premise.
	17	9	
26	8	1	The rejection of this claim incorporates an invalid premise.
27	10	9	The rejection of this claim incorporates an invalid premise.
28	11	9	The rejection of this claim incorporates an invalid premise.
29	13	9	The rejection of this claim incorporates an invalid premise.
30	14	9	The rejection of this claim incorporates an invalid premise.
31	15	11	The rejection of this claim incorporates an invalid premise.
32	18	8	The rejection of this claim incorporates an invalid premise.
33	20	19	The rejection of these claims incorporates an invalid premise
	22	21	
34	37	1	The rejection of this claim incorporates an invalid premise.
35	38	9	The rejection of this claim incorporates an invalid premise.

In section 36, the office action states that claims 24, 26, 28, and 33-34 are rejected under 35 U. S. C. 103(a) as being unpatentable over Below in view of Ramil. These claims relate to preceding independent claims as follows

<b>Dependent claim</b>	<b>Related independent claim</b>
24	23
26	25
28	27
33-32	32

In section 6, the office action rejected claims 23, 25, 28, and 32 because they were “anticipated by P. A. Below et al.” As shown in the next chapter of this paper, those claims were not anticipated by the P. A. Below patent. If the rejections of claims 24, 26, 28, and 33-

34 are based on the rejections of claims 23, 25, 28, and 32, the rejections of claims 24, 26, 28, and 33-34 are unjustified because the rejections of claims 23, 25, 28, and 32 are unjustified.

The office action then rejects more claims incorporating the rejections in previous claims. The following table shows the structure of the rejections and provides our rebuttals

Section of the Office Action	Claim rejected by this section	Incorporates the rejection of this claim	The reason this rejection is invalid.
37	24	23	The rejection of these claims incorporates an invalid premise.
	28	27	
	33	32	
38	26	25	The rejection of this claim incorporates an invalid premise.
39	34	32	The rejection of this claim incorporates an invalid premise.

#### **Detailed Rebuttal of Other Claim Rejections**

Sections 2 through 5 of the office action address claim 25 and 26, stating that the claims are non-statutory. Our patent attorney will handle the rebuttal of those claims.

Section 6 of the office action introduces sections 7 to 14.

Section 7 addresses claim 23. The office action asserts that the Paul Below patent shows how to use stratified sampling to count function points using a sampling technique. The office action further asserts that our patent is obvious given the Paul Below patent. This assertion is unfounded. Claim 23 claims the use of sampling to

*estimate at least one of a cost and an amount of necessary resources for an effort related to computer software development, computer software maintenance, and information technology services.*

The present invention is not obvious in light of the Paul Below patent. The present invention goes far beyond the Paul Below patent. First, the present invention classifies the sampled code into categories and estimates the difficulty of the categories. Second, the present invention shows how to use the classification to estimate at least one of cost and resources required. Unless the Paul Below patent claims all imaginable use of stratified sampling with respect to computer code, it is hard to see how claim 23 can be rejected based

on the Paul Below patent.

Section 8 addresses claim 25. The office action rejects our claim using the same reasoning it uses in section 7. Again, this is unfounded. The Paul Below patent's claims are all about function point counting. Going from counting function points to estimating costs and resources for specific projects (such as porting) is a huge leap, and that leap is not justified by the Paul Below patent. Perhaps the office action doesn't understand the importance of the categories and their difficulties. One can not make an accurate estimate of costs and resources by simply using function point counts. Source code isn't homogenous enough for that.

Section 9 addresses claim 27. The office action rejects our claim using the same reasoning it uses in section 7 and 8. As previously shown, the reasoning behind this rejection is invalid.

Section 10 addresses claim 32. The office action rejects our claim using the same reasoning it uses in section 7 and 8. As previously shown, the reasoning behind this rejection is invalid.

Section 11 addresses claim 29. The office action's rejection of claim 29 incorporates its rejection of claim 27. As previously explained, the office action's rejection of claim 27 is invalid. Its rejection of claim 29 is invalid because it incorporates an invalid premise.

Section 12 addresses claim 30. The office action's rejection of claim 30 incorporates its rejection of claim 29. As previously explained, the office action's rejection of claim 29 is invalid. Its rejection of claim 30 is invalid because it incorporates an invalid premise.

Section 13 addresses claims 31 and 36. The office action's rejection of claim 31 incorporates its rejection of claim 27. As previously explained, the office action's rejection of claim 27 is invalid. Its rejection of claim 31 is invalid because it incorporates an invalid premise. The office action's rejection of claim 36 incorporates its rejection of claim 32. As previously explained, the office action's rejection of claim 32 is invalid. Its rejection of claim 36 is invalid because it incorporates an invalid premise.

Section 14 addresses claim 35. The office action's rejection of claim 35 incorporates its rejection of claim 32. As previously explained, the office action's rejection of claim 32 is invalid. Its rejection of claim 35 is invalid because it incorporates an invalid premise.

Section 15 is an introductory section.

Sections 16 to 39 have already been addressed.

#### IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-38, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,



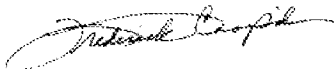
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#### CERTIFICATION OF TRANSMISSION

I certify that I transmitted via EFS this Response under 37 CFR §1.111 to Examiner B. Wang on October 17, 2007.



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